

## REMARKS

### Summary of Office Action

Claims 1-14, 17-30, 33-43, 46-49, 52, 53, 56, 57 and 60-73 were pending in the above-identified patent application. Of those, each of claims 60 and 61 had been withdrawn from consideration as being drawn to a nonelected invention, and each of claims 62-73 had been withdrawn from consideration as being drawn to a nonelected species.

The Examiner rejected claims 4-6, 8, 9, 18, 48, 52 and 56 under 35 U.S.C. § 112, first paragraph, as allegedly having scope beyond what is enabled by applicant's specification. Claims 4-10, 17-20, 24-27, 34, 38-40 and 47 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter that applicant regards as the invention. Claims 1-14, 17-30, 33, 34, 48, 49, 52 and 53 were rejected under 35 U.S.C. § 101 as allegedly being drawn to nonstatutory subject matter. Claims 1-14, 17-30, 33-43, 46-49, 52, 53, 56, 57 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious from certain prior art allegedly admitted by applicant, in view of Pilipovic U.S. Patent 6,456,982.

The Examiner also objected to claims 1, 22, 35, 48, 52 and 56 because of an enumerated informality.

### Summary of Applicant's Reply

Applicant has amended claims 1, 4-11, 18-22, 25-27, 34, 35, 39-41, 48, 49, 52, 53, 56 and 57, and has cancelled claim 24 without prejudice, in order to more particularly define the invention. The Examiner's objection and rejections are respectfully traversed.

Applicant's Reply to the  
The Claim Objections

The Examiner objected to claims 1, 22, 35, 48, 52 and 56 because of a perceived inconsistency in references to "data that represents price in a financial system," "price data" and "data." While applicant believes that the claims were clear, applicant has, solely in order to advance prosecution of this application, amended the claims to define "price data" as "representing price in a financial system," and then to make all antecedent references to "price data."

For at least this reason, applicant respectfully requests that the claim objections be withdrawn.

Applicant's Reply to the Rejection  
Under 35 U.S.C. § 112, First Paragraph

Claims 4-6, 8, 9, 18, 48, 52 and 56 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly having scope beyond what is enabled by applicant's specification. This rejection is respectfully traversed.

According to the Examiner, the subject matter of claims 4-6, 8, 9, 18, 48, 52 and 56 is not enabled because in those claims, no particular way to determine the "range ... expected, based on Brownian motion" is defined. Because that claim language therefore can be said to read on the expected range no matter how determined, the Examiner concludes that the claim is broader than what is enabled.

The Examiner is attempting to limit the expected range recited in applicant's claims to that determined according to the "single formula" allegedly disclosed by applicant. Applicant understands this reference by the Examiner to a "single formula" to be a reference to the "square root" relationship disclosed in specification and defined in at least claims 5, 8, 9, 26, 39, 49 and 53.\*

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\* To that extent, applicant does not understand why claims 5, 8 and 9 were included in this rejection.

Applicant respectfully notes that the specification discloses at least one other way to determine the expected range -- i.e., by using a Brownian motion standard generator as disclosed in Paragraphs [0011], [0033], [0049] and [0050] and recited in claims 2, 23 and 36. Accordingly, it would be not only unfair, but also inappropriate, to limit applicant's claims to only one disclosed embodiment. Indeed, it is well-settled that an applicant need not disclose every possible embodiment covered by his or her claims. As stated by the Court of Customs and Patent Appeals:

[T]o provide effective incentives, claims must adequately protect inventors. To demand that the first to disclose shall limit his claims to what he has found will work or to materials which meet the guidelines specified for "preferred" materials in a process such as the one herein involved would not serve the constitutional purpose of promoting progress in the useful arts.

In re Goffe, 542 F.2d 564, 567, 191 USPQ 429, 431 (CCPA 1976) (cited in MPEP § 2164.08).

Rather, "[t]he examiner should determine what each claim recites and what the subject matter is when the claim is considered as a whole, not when its parts are analyzed individually" (MPEP § 2164.08; emphasis in original). Viewed in that light, and considering applicant's claims as a whole, applicant is not claiming to have invented comparing a range of data to a range expected based on Brownian motion. Applicant is claiming a method or system for analyzing a system that varies over time, of which the data comparison is only one element. Applicant has fully enabled the method and system claimed. The fact that in doing so he has provided two embodiments for one of the elements of the claims does not mean that his invention should be limited to one or even both of those two embodiments.

Moreover, the enablement requirement is qualified. The invention need not be absolutely enabled -- only enabled

"without undue experimentation." No undue experimentation would be required to make and use applicant's invention "as a whole," insofar as two embodiments of the comparison element (the only element as to which enablement has been challenged) have been disclosed. But even if applicant is required to have enabled all possible embodiments of the comparison element, the Examiner has not established that undue experimentation would be required to devise additional ways to implement the comparison element. ("To establish a reasonable basis for questioning the adequacy of a disclosure, the examiner must present a factual analysis of a disclosure to show that a person skilled in the art would not be able to make and use the claimed invention without resorting to undue experimentation" MPEP § 2164.06(c); emphasis added.)

The Examiner uses Pilipovic as an example of a Brownian motion comparison technique that is not enabled. However, first, if the Pilipovic disclosure were in fact correct, its existence would belie the proposition that undue experimentation would be required to implement applicant's claimed invention using a Pilipovic-type comparison. But Pilipovic is not correct, at least in its discussion of Brownian motion, which, as quoted by the Examiner, considers Brownian motion to include both deterministic and random terms. This view of Brownian motion -- as including a random component -- is an erroneous view as explained in applicant's July 2, 2007 reply.

Applicant's invention is based on the realization that Brownian motion is completely deterministic, and that, therefore, any deviation from the deterministic variation (what Pilipovic views as a random portion of Brownian motion) is not a part of the Brownian motion variation, but rather gives information about the state of the system. Therefore, rather than being an example of a technique within applicants' claims that is not enabled by applicant, Pilipovic is outside applicant's claims. Thus, not only has the Examiner not shown

that undue experimentation would be required to implement applicant's claims, but the Examiner has not even shown a valid example of the existence of an undisclosed technique within applicant's claims that would require even "due" experimentation to implement.

To sum up, applicant is not required to disclose every embodiment within his claims. To the extent that the full scope of the claim must be enabled without requiring undue experimentation, it is the full scope of the invention as a whole that must be enabled, not every possible variant of every element of the claim. Applicant believes that he has enabled the full scope of the claimed invention as a whole. Moreover, the burden is on the Examiner to show lack of enablement and that burden has not been met.

For at least the foregoing reasons, applicant respectfully requests that the rejection under 35 U.S.C. § 112, first paragraph, be withdrawn.

Applicant's Reply to the Rejection  
Under 35 U.S.C. § 112, Second Paragraph

Claims 4-10, 17-20, 24-27, 34, 38-40 and 47 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter that applicant regards as the invention. This rejection is respectfully traversed.

The Examiner raised a number of issues under the umbrella of 35 U.S.C. § 112, second paragraph. Those issues include the nature of the actual and expected relationships, the drawing of multiple conclusions from the same system, and issues of antecedent basis in the claims involving recursive repetitions of various elements. The Examiner also rejected claim 24 because it allegedly was not clear what the claimed "means for applying bootstrapping techniques" was.

First, applicant has cancelled claim 24 without prejudice.

Second, with regard to the "actual relationship," applicant has amended the claims to recite that the actual relationship is computed (confirming the Examiner's supposition). With regard, however, to the "expected relationship," the Examiner is referred to the discussion above regarding the rejection under 35 U.S.C. § 112, first paragraph.

Specifically, the claims are not required to describe the invention. Rather the claims are required only to define the invention -- i.e., to define what would be infringing conduct on the part of an unlicensed third party. There are multiple ways to determine the expected relationship. At least two of those ways are described in the specification, and the claims must be read in light of the specification, without importing limitations into the claims from the specification. The definiteness requirement is designed to ensure that prospective infringers can determine whether or not they are infringing. Applicant respectfully submits that the claims are definite in that respect. A prospective infringer will know if he or she is determining an expected relationship, whether by using one of the techniques described in the specification, or some other technique.

With regard to the recursive claims, applicant respectfully submits that in the amended claims, it is clear which iteration of each claim element is being referred to by each recitation of such element in each claim.

Finally, with regard to the drawing of multiple conclusions from a system, applicant first has cancelled the "determining from ..." limitation from claim 4, because claim 4 further defines the "comparing" of claim 1 and the "determining," or drawing of conclusions, is already defined in claim 1.\*

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\* Applicant respectfully submits that this amendment is not a narrowing amendment -- indeed it is a broadening

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With regard to the other claims to which this aspect of the rejection is directed, the drawing of multiple conclusions is precisely what is contemplated by the invention. The Examiner's attention is directed, e.g., to at least Paragraph [0043] of the specification. At any given moment, one may want to look back on different time scales -- e.g., inter alia, hourly, daily, weekly and annually -- because while a system may be in one condition on one time scale, the same system may be in a different condition on a different time scale. For example, on an intra-day basis (i.e., an hourly time scale), a market may be in a trend, while that same market may be in a congestion condition when viewed on a weekly time scale. Similar differences may exist between observations on other longer (monthly, annually, etc.) and shorter (minutes, seconds, etc.) time scales. And in addition to looking back over different time scales at any given moment, one may choose to look back at different moments as well (e.g., to see if a trend, when one exists, is changing, or if a congestion, when one exists, is ending; these are just examples).

Finally, applicant has additionally amended claim 9 to make the last two elements consistent with Paragraph [0038] of the specification.

For at least the foregoing reasons, applicant respectfully requests that the rejection under 35 U.S.C. § 112, second paragraph, be withdrawn.

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amendment -- under the doctrine of Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 62 USPQ2d 1705 (2002), and related cases.

Applicant's Reply to the  
Rejection Under 35 U.S.C. § 101

Claims 1-14, 17-30, 33, 34, 48, 49, 52 and 53 were rejected under 35 U.S.C. § 101 as allegedly being drawn to nonstatutory subject matter. This rejection is respectfully traversed.

As method claims, claims 1-14, 17-21, 48 and 49 have been rejected under the "machine-or-transformation test" set out in In re Bilski, 545 F.3d 943, 88 USPQ2d 1385 (Fed. Cir. 2008), as not being tied to a particular machine or transforming an article to a different state or thing. However, applicant respectfully submits that these claims do in fact meet the "transformation prong" of the machine-or-transformation test.

Specifically, one transformation that previously had been held to be statutory and that was endorsed in Bilski was a transformation of data that is not viewable by a human observer into a state that is viewable by a human observer. In the example cited, the transformation was of X-ray attenuation data into an image of human tissue. Bilski, 543 F.3d at 962-63, 88 USPQ2d at 1397, citing In re Abele, 684 F.2d 902, 908-09, 214 USPQ 682, 687 (CCPA 1982). Here, instead, the transformation is of data representing the Brownian motion condition of a system from a state that is not viewable to a state that is (i.e., an indication of trending or congestion).

The situation is analogous to the measurement of the temperature of a physical system. Temperature is an underlying physical truth -- all matter has a temperature. And yet had Gabriel Fahrenheit (or one of his predecessors in the development of the thermometer) been applying, under the current statutory regime, for a patent for a method of measuring temperature by placing a material with a known coefficient of thermal expansion into contact with matter whose temperature is to be measured and watching the expansion



or contraction of that material, it is hard to imagine that that application would have been denied. Applicant's method is no different from a Section 101 perspective. The fact that Fahrenheit gathered and processed data in an analog manner from the system being measured, using the expansion and contraction of a working fluid (e.g., alcohol or mercury), while applicant gathers and processes data in a digital manner from the system being measured, should not make a difference. Fahrenheit allowed the visualization of temperature; applicant allows the visualization of Brownian motion condition.

For at least these reasons, claims 1-14, 17-21, 48 and 49 should be considered statutory.

As means-plus-function claims, claims 22-30, 33, 34, 52 and 53 have been rejected because the Examiner alleges that under their broadest reasonable interpretation, the recited "means" could include software elements, resulting in the claims reading on software per se. Applicant respectfully disagrees.

Applicant understands that rejections such as this have been made and upheld in cases where means-plus-function claims have been introduced in their preambles as defining a "system" and the elements of that system could have been interpreted as pure software. In such cases, the rejections may have had merit because the term "system" can include a method -- e.g., as in a "system" for picking racehorses, lottery numbers, etc., on which to bet. However, the claims in question here have been presented as "apparatus" claims -- not as "system" claims. While applicant understands that preamble limitations are not always given patentable weight, applicant respectfully submits that that cannot be the case with words that define the statutory class being claimed. Therefore, applicant's claims must be interpreted as apparatus in which the software elements (assuming, arguendo, that that is what they are) are implemented in the disclosed hardware

(see, e.g., Paragraphs [0044]-[0049] of applicant's specification).

Applicant further notes that the Examiner relies on the description of software in Paragraph [0046] to justify the characterization of applicant's claim elements as software. However, the software described in Paragraph [0046] is described as working in conjunction with hardware. More importantly, the software described in Paragraph [0046] is described only in connection with enabling distributed computing over a plurality of described computers (see withdrawn claims 60 and 61). The software described in Paragraph [0046] does not perform the functions defined in the rejected claims, which are described elsewhere in the specification (including in the claims as filed). Thus, even under the Examiner's interpretation (which applicant respectfully submits goes beyond the broadest reasonable interpretation to an unreasonable interpretation), the claims written in means-plus-function format do not read on the software described in Paragraph [0046], or on any software, per se, but only on hardware implementing the described functions.

For at least these reasons, claims 22-30, 33, 34, 52 and 53 should be considered statutory.

For at least the foregoing reasons, applicant respectfully requests that the rejection under 35 U.S.C. § 101 be withdrawn.

Applicant's Reply to the  
Prior Art Rejection

Claims 1-14, 17-30, 33-43, 46-49, 52, 53, 56, 57 were rejected under 35 U.S.C. § 103(a) as allegedly being obvious from certain prior art allegedly admitted by applicant, in view of Pilipovic U.S. Patent 6,456,982. This rejection is respectfully traversed.

The Examiner's position is that one of the conclusions recited in the claims -- i.e., the conclusion that

the system is varying erratically in a case where the data ranging equals that expected by Brownian motion -- is merely a conclusion that if the data show that motion is Brownian, then it is Brownian. The Examiner then concludes that because allegedly only one of the three "when" scenarios of the claim can occur in any given practicing of the method, then in a case where first "when" scenario applies, that limitation would read on the prior art (i.e., on the characteristics of Brownian motion itself). The Examiner then relies on Pilipovic for the use of Brownian motion to analyze financial systems, as well as for certain hardware aspects of the apparatus claims, to find the claims obvious.

First, applicant disagrees that Pilipovic teaches the use of Brownian motion to analyze financial systems. Although Pilipovic says that it is doing so, applicant believes that Pilipovic is wrong in its description of Brownian motion, as discussed above -- e.g., in interpreting Brownian motion as including a random component. Thus, while Pilipovic says that it teaches the use of Brownian motion to analyze financial systems, it does not in fact do so.

Nevertheless, in order to expedite prosecution of this application, applicant has amended the claims to delete the first "when" scenario.\* Accordingly, the claims no longer even arguably cover a "Brownian=Brownian" scenario, and the references do not show either of the other "when" scenarios (nor has the Examiner alleged that they do).\*\*

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\* Applicant respectfully submits that none of these amendments is a narrowing amendment -- indeed each is a broadening amendment -- under the doctrine of Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 62 USPQ2d 1705 (2002), and related cases.

\*\* Moreover, applicant respectfully submits that because the "when" scenarios are positively recited in the logical conjunctive ("X and Y") rather than in the logical alternative ("X or Y" or "one of X and Y"), they cover only situations  
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For at least these reasons, applicant respectfully submits that the claims, as amended, are patentable over the prior art.

Claims 48, 49, 52, 53, 56 and 57

Prior to the current amendment, independent claims 48, 52 and 56 (and their respective dependent claims 49, 53 and 57) referred to first and second durations in a manner different from the manner in which those terms were used in earlier claims. Specifically, while in all claims the first and second durations were defined as beginning at a same initial moment, in claims 48, 52 and 56, the longer duration was defined as the "second duration," while in earlier claims the longer duration was defined as the "first duration." This resulted from the differing structure of the claims, because in the earlier independent claims (claims 1, 22 and 35), only the longer duration was recited, so it was defined by the identifier "first" (which was not intended to be necessarily ordinal), while the shorter duration was not introduced until the dependent claims and therefore was defined by the identifier "second" (which again was not intended to be necessarily ordinal). On the other hand, in claims 48, 52 and 56, both durations were introduced in each independent claim and the shorter duration was introduced before the longer duration. Therefore, in claims 48, 52 and 56 the shorter duration was defined by the identifier "first" (which again was not intended to be necessarily ordinal) and the longer duration was defined by the identifier "second" (which again was not intended to be necessarily ordinal).

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where the method or apparatus meets both of the recited "when" scenarios (even though it cannot meet both at once).

All claims as they existed prior to this amendment were internally consistent, and the Examiner did not issue any rejection or objection based on the differing uses of "first duration" and "second duration " as between different claims. Nevertheless, in order to avoid confusion resulting from differing uses of "first duration " and "second duration," applicant has herein amended claims 48, 49, 52, 53, 56 and 57 to use "duration of a first length of time" and "duration of a second length of time" instead of "first duration" and "second duration."

#### Reservation of Rights

The amendments presented herein are being made solely in order to advance the prosecution of this application. Applicant does not surrender any subject matter thereby, and hereby expressly reserves the right to pursue, in one or more continuing applications, any one or more of the claims as they existed prior to the current amendment, as well as any nonelected invention or species.

#### Conclusion

For at least the reasons set forth above, applicant respectfully submits that this application, as amended, is in condition for allowance. Reconsideration and prompt allowance of this application are respectfully requested.

Respectfully submitted,

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